WHAT IS CLAIMED IS:

1. A voice activity detector using a complex Laplacian statistic module, comprising:

a fast frequency Fourier transformer for performing a fast Fourier transform on input speech to analyze speech signals of a time domain in a frequency domain;

a noise power estimator for estimating a power $\lambda_{n,k}(t)$ of noise signals from noisy speech X(k) of the frequency domain output from the fast frequency Fourier transformer; and

a likelihood ratio test (LRT) calculator for calculating a decision rule of voice activity detection (VAD) from the estimated power $\lambda_{n,k}(t)$ of noise signals from the noise power estimator and a complex Laplacian probabilistic statistical model.

2. The voice activity detector as claimed in claim 1, wherein the decision rule is a geometrical average of likelihood ratio Λ_k for the k-th frequency, the likelihood ratio Λ_k being determined by the following equation:

$$\Lambda_k \equiv \frac{p\langle X_k | H_1 \rangle}{p\langle X_k | H_0 \rangle}$$

wherein hypothesis H_0 represents the case of absence of speech; hypothesis H_1 represents the case of presence of speech; and X_k is the k-th discrete Fourier coefficient.

3. The voice activity detector as claimed in claim 2, wherein the likelihood ratio using the Laplacian statistic module is determined by the following equation:

$$\Lambda_k^{(L)} \equiv \frac{p_L\langle X_k | H_1\rangle}{p_L\langle X_k | H_0\rangle} = \frac{1}{1+\xi_k}\exp\left\{2\left(\left|X_{k(R)}\right| + \left|X_{k(I)}\right|\right)\left(\frac{|X_k| - \sqrt{\lambda_{n,k}}}{|X_k|\sqrt{\lambda_{n,k}}}\right)\right\}$$

wherein $\xi_k = \lambda_{s,k} / \lambda_{n,k}$; and $X_{k(R)}$ and $X_{k(I)}$ are a real part and an imaginary part of X_k, respectively.

4. A voice activity detection method using a complex Laplacian statistic module, comprising:

(a) performing a fast Fourier transform on input speech, and generating noisy speech X(k) to analyze speech signals of a time domain in a frequency domain;

(b) estimating a power $\lambda_{n,k}(t)$ of noise signals from the noisy speech X(k) of the frequency domain output in the step (a); and

(c) calculating a decision rule of VAD from the estimated power $\lambda_{n,k}(t)$ of noisy signals and a complex Laplacian probabilistic statistical model.

5. The voice activity detection method as claimed in claim 4, wherein the decision rule is a geometrical average of a likelihood ratio for the k-th frequency, the likelihood ratio being determined by the following equation:

$$\Lambda_k^{(L)} \equiv \frac{p_L\langle X_k | H_1\rangle}{p_L\langle X_k | H_0\rangle} = \frac{1}{1+\xi_k}\exp\left\{2\left(\left|X_{k(R)}\right| + \left|X_{k(I)}\right|\right)\left(\frac{|X_k| - \sqrt{\lambda_{n,k}}}{|X_k|\sqrt{\lambda_{n,k}}}\right)\right\}$$

wherein hypothesis H_0 represents the case of absence of speech; hypothesis H_1 represents the case of presence of speech; X_k is the k-th discrete Fourier coefficient; $\xi_k = \lambda_{s,k} / \lambda_{n,k}$; and $X_{k(R)}$ and $X_{k(I)}$ are a real part and an imaginary part of X_k, respectively.